

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-32 (Cancelled)

33. (currently amended) A method for manufacturing a semiconductor device having a hetero-junction bipolar transistor over a semiconductor substrate, comprising the steps of:

(a) preparing a semiconductor substrate having a first semiconductor layer of a first type over the semiconductor substrate, a second semiconductor layer of a second type over the first semiconductor layer, and a third semiconductor layer of the first type over the second semiconductor layer, wherein the first type and the second type are opposite;

(b) forming an emitter electrode of the hetero-junction bipolar transistor over the third semiconductor layer;

(c) after the step (b), forming the third semiconductor layer into a mesa-shaped emitter layer of the hetero-junction bipolar transistor;

(d) after the step (c), forming a base electrode over the second semiconductor layer outside the mesa-shaped emitter layer; and

(e) after the step (d), forming a photo resist film over the emitter and base electrodes; and

~~(e)~~(f) after the step ~~(d)~~(e), ~~forming~~etching the second semiconductor layer ~~into~~to form a mesa-shaped base layer of the hetero-junction bipolar transistor,

wherein in the step (e), an outer periphery of the base electrode is exposed from the photo resist film; and in the step (f), the photo resist film and base electrode act as an etching mask.

34. (Original) A method according to Claim 33, further comprising the steps of:

(f) forming a collector electrode of the hetero-junction bipolar transistor over the first semiconductor layer outside the mesa-shaped base layer; and

(g) forming the first semiconductor layer into a mesa-shaped collector layer of the hetero-junction bipolar transistor.

35. (currently amended) A method according to Claim 34, ~~wherein the step (e) comprises the steps of:~~

~~(e1) forming a photoresist film over the mesa shaped emitter layer; and~~

~~(e2) performing a wet etching to form the second semiconductor layer into the mesa shaped base layer~~33,  
wherein in the step (f), a wet etching is performed.

Claim 36 (cancelled)

37. (Original) A method according to Claim 35, wherein the first, the second, and the third semiconductor layers are comprised of GaAs and the base electrode is comprised of Au.

38. (Original) A method according to Claim 35, wherein the mesa-shaped collector is comprised of a lower portion and an upper portion, and the collector electrode is electrically connected to the lower portion of the mesa-shaped collector.

39. (Original) A method according to Claim 33, wherein the semiconductor device includes a Schottky diode and a resistance element over the semiconductor substrate.

40. (currently amended) A method for manufacturing a semiconductor device having a hetero-junction bipolar transistor over a semiconductor substrate, comprising the steps of:

- (a) preparing a semiconductor substrate;
- (b) forming a first semiconductor layer of a first type over the semiconductor substrate;
- (c) forming a second semiconductor layer of a second type, which is opposite of the first type, over the first semiconductor layer;
- (d) forming a third semiconductor layer of the first type over the second semiconductor layer;

(e) forming an emitter electrode of the hetero-junction bipolar transistor over the third semiconductor layer;

(f) after the step (e), forming the third semiconductor layer into a mesa-shaped emitter layer of the hetero-junction bipolar transistor;

(g) after the step (f), forming a base electrode over the second semiconductor layer outside the mesa-shaped emitter layer; and

(h) after the step (g), forming a photo resist film over the emitter and base electrodes; and

~~(h)~~(i) after the step ~~(d)~~(h), forming~~etching~~ the second semiconductor layer ~~into~~to form a mesa-shaped base layer of the hetero-junction bipolar transistor,

wherein in the step (h), an outer periphery of the base electrode is exposed from the photo resist film; and in the step (i), the photo resist film and base electrode act as an etching mask.

41. (currently amended) A method according to Claim 40, further comprising the steps of:

~~(i)~~(j) forming a collector electrode of the hetero-junction bipolar transistor over the first semiconductor layer outside the mesa-shaped base layer; and

~~(j)~~(k) forming the first semiconductor layer into a mesa-shaped collector layer of the hetero-junction bipolar transistor.